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(71) Applicant *(for all designated States except US)*: **SEMEQUIP INC.** [US/US]; 34 Sullivan Road, Unit 21, Billerica, MA 01862 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **KRULL, Wade, A.** [US/US]; 8 Smith Street, Marblehead, MA 01945 (US). **JACOBSON, Dale, C.** [US/US]; 16 Flintlock Road, Salem, NH 03079 (US).

(74) Agents: **PANIAGUAS, John, S.** et al.; Katten Muchin Zavis Rosenman, Suite 1600, 525 West Monroe Street, Chicago, IL 60661-3693 (US).

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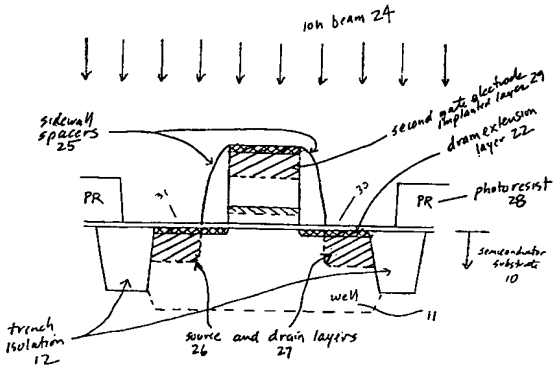
(54) Title: A SEMICONDUCTOR DEVICE AND METHOD OF FABRICATING A SEMICONDUCTOR DEVICE



Process showing source and Drain implant providing gate electrode second implant doping.

(57) Abstract: A method is proposed for the fabrication of the gate electrode of a semiconductor device such that the effects of gate depletion are minimized. The method is comprised of a dual deposition process wherein the first step is a very thin layer that is doped very heavily by ion implantation. The second deposition, with an associated ion implant for doping, completes the gate electrode. With the two-deposition process, it is possible to maximize the doping at the gate electrode/gate dielectric interface while minimizing risk of boron penetration of the gate dielectric. A further development of this method includes the patterning of both gate electrode layers with the advantage of utilizing the drain extension and source/drain implants as the gate doping implants and the option of offsetting the two patterns to create an asymmetric device. A method is also provided for the formation of shallow junctions in a semiconductor substrate by diffusion of dopant from an implanted layer contained within a dielectric layer into the semiconductor surface. Further, the ion implanted layer is provided with a second implanted species, such as hydrogen, in addition to the intended dopant species, wherein said species enhances the diffusivity of the dopant in the dielectric layer.

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